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ANNUAL REPORT OF SECRETARY OF AGRICULTURE

The annual report of the Secretary of Agriculture to the President for the fiscal year 1932 should have especial interest to the personnel of this Bureau in that it discusses in considerable detail the whole field of research in agriculture, in which field practically all the work of this Bureau falls. From analyses of the expenditures of the Department as given in this report, it appears that only a little over 10 per cent of the total of upwards of \$300,000,000 is for strictly agricultural purposes, meaning essentially research in the interests of agriculture and human welfare. The achievements of the Department of Agriculture in this field are presented in a new and very informing way and the reading and study of this report will be well worth the time of every technical and other employee of this Bureau. The edition of this report is limited, but an effort will be made to send one copy to each field station of the Bureau.

CHIEF OF BUREAU VISITS WESTERN STATIONS

As a matter of record, reference may be appropriately made here to a trip of station inspection in the West made by the Chief of Bureau during the period October 9 to November 8. Altogether some 30 stations, including a few cooperating State institutions, were visited. All but two of these were in the Rocky Mountain or Pacific Coast States, viz, Utah, Idaho, Washington, Oregon, and California. The cooperation given by Bureau personnel throughout the trip is heartily appreciated. By use of motor transportation furnished by some of the stations, a much greater number of stations were visited than would otherwise have been possible in the time at disposal, and the cultures and type of country in which work was being conducted could be seen over a much broader area. In retrospect, it is pleasant to report a most favorable reaction on the quality of the work and the interest and enthusiasm evidenced by the personnel. It was encouraging, also, to note that much new material of promise is developing among the younger workers in these field stations. Some of these stations had never been visited by the Chief of Bureau. It is hoped that this type of "neglect," hitherto unavoidable, will be cured under the more favorable conditions which now obtain.

STORED PRODUCT INSECTS

Decaying peaches bring infestation to figs.--On account of the importance of the dried fruit beetle, Carpophilus hemipterus L., as a pest of figs, H. C. Donohoe, of Fresno, Calif., made, on October 5, a survey throughout a 140-acre peach orchard. On account of market conditions the 1932 crop in this orchard was not harvested, but allowed to fall and rot on the ground. Although no signs of infestation by Ephestia spp. were seen, Mr. Donohoe estimated that the fruit beneath each tree contained an average of at least 12,000 larvae and adult nitidulid beetles, for the most part C. hemipterus. Granting about 100 bearing trees to the acre, there would be an estimated 168,000,000 Carpophilus beetles developing in the orchard ready under favorable conditions to fly to fig orchards. One thus sees how adverse market conditions and lack of disposal of fallen fruit in connection with the peach crop may be detrimental to the fig crop.

Losses due to fig moths.--Perez Simmons, of Fresno, writes that, if one assumes a 1932 crop of about 13,300 tons of dried figs and bases computations on averages secured by B. J. Howard, of the Food and Drug Administration, covering detected infestations, and consequent loss in sales value, of deliveries made at packing houses, the estimated loss to fig growers this year on account of infestation by insects will total about \$216,000, not including fruit culled out on ranches. The greatest part of this loss was caused by moth larvae, chiefly Ephestia figulilella Greg.

Conditions influencing pea weevil infestation--Experiments to determine the relation of the time of planting peas and time of blooming to the amount of weevil (Bruchus pisorum L.) infestation are reported by Tom Brindley, of Moscow, Idaho. "No absolute relationship seems to exist between either of these dates and the amount of weevil infestation. There is, however, a general decrease noticeable in the amount of weevil infestation in the later plantings. * * * One of the outstanding points, to me, * * * is the fact that the pea weevil seems to be able to lay eggs and infest peas as long as there is a supply of pea pollen on which the adults can feed and pods present on which they can lay their eggs. From my observations, peas planted on the same day furnish pods for egg deposition for about 25 days; yet in laboratory tests the weevils laid for 84 days and no doubt would have continued for a longer time had the weather remained warm. The weevils were taken into a warm room, but failed to remain active."

Longevity of pea weevils in storage.--Mr. Brindley also reports "that weevils (B. pisorum) in the warehouse from the 1931 crop of peas are continuing to live in goodly numbers." At the end of October, 1932, the mortality of these weevils in shelled peas was only 69 per cent and in unshelled peas, 66 per cent. In view of the practice of holding seed peas for two years in storage before planting, this high survival about 15 months after harvesting is important.

Novel method of mill-insect control.—G. B. Wagner, Kansas City, Mo., writes that "A mill in southern Missouri has installed a commercial method for combating insects" by which "compressed air is bubbled through a tank in which the liquid is held. This air carries vapors of the liquid into the milling machinery as the mill is operated, * * * for two hours each day. In one month's time this system has reduced the percentage of live insects from 85.34 to 72.87. This liquid has been analyzed as being 90 per cent alcohol and 10 per cent orthodichlorobenzene. This is very inflammable. It seems to give excellent control of the Mediterranean flour moth (Ephestia kuehniella Zell.) and indicates that other mill insects are not so susceptible * * *; however, the percentage of live insects is gradually being decreased."

Rice weevil survey.—To determine the average infestation by the rice weevil in stored corn in the Southern States, S. E. McClendon, in charge of the Thomasville, Ga., station, selected representative counties, in each of which he made in October counts of 100 ears of corn taken from each of 10 farms, noting the number of ears having weevils. The cribs examined in Marion County, Ga., showed ear infestations of from 8 to 64 per cent, or an average of 37.1 per cent. Similar examinations in Calhoun County, Fla., showed that the infestations were much heavier and more uniform, ranging from 34 to 58 per cent, with an average of 47.7 per cent, and in Houston County, Ala., the range in different cribs was from 8 to 42 per cent, with an average of 27.8 per cent. Mr. McClendon points out that the percentage of infested ears is not a true indication of damage, but that the number of weevils per ear infested is an essential factor (data not given in this record). He further states that "where corn is held approximately to the time of the new harvest, infestations are heavy."

Patent asked on trap for tobacco insects.—W. D. Reed, of Richmond, Va., states that an application has been made for a public service patent on the suction light trap recently devised in Richmond for trapping cigarette beetles and tobacco moths in tobacco storage warehouses. Experiments with these traps, conducted in cooperation with a tobacco company in Richmond and with one in Winston-Salem, N. C., are being continued, with excellent results.

TOXICOLOGY AND PHYSIOLOGY OF INSECTS

Mosquito eggs by air mail.—F. L. Campbell, Takoma Park, Md., who is conducting a series of tests of insecticides using mosquito larvae, reports that tests are now being made successfully with larvae of Culex quinquefasciatus Say from eggs received daily by air mail from the Bureau laboratory at Orlando, Fla.

FRUIT AND SHADE TREE INSECTS

Mediterranean fruit fly sterilization by heat.—A. C. Mason, of the Honolulu laboratory, has now completed seven experiments on heat sterilization for the destruction of Mediterranean fruit fly larvae (Ceratitis capitata Wied.). After an approach period of 8 hours to bring the temperature to 110° F., 100 per cent mortality was obtained in star apples after 4 hours' heating, in guavas after 3, 4, and 5 hours, respectively, and in kamani nuts after 7 hours with a mortality approaching 100 per cent after 6 hours. Mr. Mason states: "The results of these experiments indicate that the time to insure 100 per cent mortality, where a preheating period of 8 hours is used, can safely be reduced to 7 hours at least, and perhaps to 5 or 6 hours with most fruits."

Sulphur dusts kill date mite.—"During the latter part of August and the first part of September," says F. S. Stickney, of the Whittier, Calif., laboratory, "a series of tests using nicotine dust, flowers of sulphur, gas sulphur, and ortho sulphur (ground sulphur) were made on infested fruits * * * to obtain information on the reaction of the date mite (Paratetranychus heteronychus Ewing). * * * the nicotine dust proved ineffective in ridding the dates of mites, though when it was applied uniformly the mite population appeared to be eventually reduced to some extent. But all three sulphurs were effective in destroying the mite when applied uniformly, lightly as well as heavily."

Fruit-moth parasites from the Orient established in New Jersey.—In further reporting on the recovery collections of parasites of the oriental fruit moth (Grapholitha molesta Busck), H. W. Allen, in charge of the peach moth parasite work at Moorestown, N. J., states: "The outstanding development for the month was the recovery of Perisierola (from Australia) from fruit-moth cocoons on collections of five successive weeks at one location in New Jersey, and the recovery of typical cocoons (emergence not yet obtained) from two other locations in New Jersey and one in Delaware. Dioctes sp. from Japan has also been recovered from a collection in Moorestown, September 15, following a liberation made in August. These recoveries make the outlook for the establishment of these two species favorable."

Rodents destroy hibernating oriental fruit moth larvae in weedy orchards.—In handling trap bands used for gathering oriental fruit moths near Moorestown, N. J., Dr. Allen has made the following observation: "In spite of the fact that all bands had previously been placed in orchards having a heavy infestation of late peaches, there was a marked difference in the number of cocoons trapped, which appeared to be related to the degree of clean culture in the orchards. In those orchards that had not been kept clear of weeds during the exposure of the bands very few larvae (average, 1.1 cocoons per band) were trapped, while in cleanly cultivated orchards a surprisingly large number (average, 22.7 cocoons per band) were trapped. In the weedy orchards there was plenty of evidence of rodents (probably field mice) working on trap bands and de-

stroying fruit-moth larvae cocooned therein, while in the cleanly cultivated orchards evidence of such predatory work was lacking. * * * It is, of course, probable that the weedy orchards provided shelter for cocooning larvae, thus reducing the numbers coming to the tree trunks to cocoon in trap bands, but the activity of predators (presumably field mice) is indicated in other experiments not thus limited. In the eight lots of 50 cocoons each, exposed at intervals between September 20 and October 29, half in a weedy orchard and half in a clean one, no destruction of cocoons or evidence of mice occurred in the clean orchard, while such destruction in the weedy orchards * * * averaged 58 per cent * * *. These preliminary observations indicate the probability of valuable clean-up work by predators under certain conditions."

Influence of light, temperature, and wind on fruit-moth adults.—L. F. Steiner, of Cornelia, Ga., summarizes the observations on the behavior of adults of the oriental fruit moth as follows: "Light intensity appears to be the most important factor regulating adult activity, with the optimum condition occurring during the hour after sunset * * * and at dawn. During these two periods 75 per cent of the captures are usually made. Certain unfavorable meteorological conditions, if they occur during these two periods, can thus practically prevent activity over the full 24-hour day. These may be either high wind velocities of 8 or 10 miles or more per hour, rain, or temperatures below 60° F. Complete darkness will prevent activity and so will bright sunlight, with a few unexplainable exceptions. Except on warm, cloudy days or bright moonlight nights, bait traps have a very short period each day in which to function. Their time is shortened still further during April and May, when low morning temperatures may prevent morning activity. A highly efficient bait must, therefore, be present at all times if the moths are to be captured * * * before the urge to oviposit delays their response to the traps. The prevention of activity by weather conditions other than low temperatures is likely to force an accumulation of fully developed eggs in the females, with the result that a part of the eggs may be deposited before the moths react to the bait."

The hog plum in Panama.—The hog plum is the preferred host plant of the fruit fly Anastrepha fraterculus Wied. The following notes are culled from the October report of James Zetek, of the Canal Zone station: "The hog plum is the abundant fruit at this time and its fruit season lasts several months. Some trees still have small fruits * * *. When the fruit drops to the ground, if unbroken, and if it receives the full effect of the sun's rays, the larvae inside become cooked. * * * We placed various vegetables and fruits in cages with A. fraterculus adults and obtained oviposition in tomato, sweetpotato, and an elongated squashlike cucumber grown by the Chinese. A. fraterculus tried to oviposit on the eggplant, but the skin was too slippery. * * * We were unable to get oviposition in oranges. The adults tried hard enough, but the eggs did not get into the fruit. They either stuck out of the puncture or else were laid flat on the fruit."

Codling-moth emergence from cocoons in the ground delayed.—E. J. Newcomer, in charge of the Yakima, Wash., laboratory, makes the following report on experiments to determine whether emergence of the codling moth (*Carpocapsa pomonella* L.) is delayed when the pupal period is passed in the ground: "In order to find out the relation of the emergence of codling moths from the soil to the total emergence, 500 larvae were confined in screen cages in an orchard in the fall of 1931. Pieces of wood were placed in such a manner that the larvae were forced to spin their cocoons either at the surface of the soil or beneath the soil against the wood. The cages were on the north side of a tree and were shaded during the summer by the apple foliage and by clumps of alfalfa. * * * A soil thermograph showed that the mean temperature just below the soil surface during the period of emergence was about 50° F. The mean air temperature * * * was 62° F. Daily records of emergence were made, and moths emerged from May 9 to July 3. Comparing this emergence with the records of moths caught in bait traps, it was found that emergence from the soil was somewhat retarded, as shown below:

"Percentage of emergence	Moths emerging from soil	Moths caught in bait traps
25	June 6	May 15
50	June 11	May 17
75	June 14	June 12
Maximum	June 14	May 16"

Codling-moth larvae better able to enter apples immediately after hatching.—Fred Dean, of Yakima, has reported on tests in which recently hatched codling-moth larvae of different ages were placed on sprayed apples. "Eggs just ready to hatch were attached to the apples and the control obtained was 37.2 per cent. Newly hatched larvae, less than 1 hour old, were placed on the apples with a camel's-hair brush, and the control was 49.1 per cent. Similar larvae that had been allowed to crawl around in glass jars for one or two hours were also used, and with them the control obtained was 77.3 per cent. It is obvious that the older larvae are less able to enter the apples, and that for experimental work the use of eggs is more dependable than that of young larvae."

Experiments with sprays for the control of the peach borer.—Reporting rather fully on the results of spraying 1, 2, 3, and 7 year old trees with paradichlorobenzene oil emulsions during the period October 10 to 13, O. I. Snapp and J. R. Thomson, of Fort Valley, Ga., summarized their results as follows: "Paradichlorobenzene oil emulsions applied as sprays are an improvement over the paradichlorobenzene crystal treatment for the control of the peach borer in trees 4 years of age and older, and it is the only method that is safe for the efficient control of the insect in 1, 2, and 3 year old trees."

Seasonal mortality of California red scale.---F. H. Lathrop, Whittier, Calif., reporting a series of experiments to determine the mortality of red scale on lemon over a 12-month period, July 23, 1930, to August 19, 1931, says: "With few exceptions, mortality was on the average highest in the second instar throughout the year. Mortality was highest for scales set out during the winter months, amounting to almost 100 per cent for scales set out during November and December. The lowest mortality records were obtained during the following months: March, 1931 (41.8 per cent), July, 1930 (42.2 per cent), August, 1930 (45.5 per cent), June, 1931 (55.3 per cent), and August, 1931 (57.0 per cent)."

JAPANESE AND ASIATIC BEETLES

Hibernation or diapause believed unnecessary for Asiatic garden beetle.---H. C. Hallock, of the Asiatic beetle substation at Westbury, Long Island, reports that recent studies indicate that "a rest period, such as normally occurs in winter, is not absolutely necessary to the Asiatic garden beetle (Autoserica castanea Arrow) larvae in order to complete their development. There is a possibility that there might be two generations a year of the Asiatic garden beetle if it should become established in the vicinity of New Orleans, La., or in other States with a similar temperature, provided the soil moisture was also proper for the development of the insect."

Cocooning of Tiphia stimulated by new treatment.---In connection with his investigations of the parasite Tiphia popilliavora Rohwer, M. H. Brunson, Moorestown, N. J., has devised a new method of handling parasitized Japanese beetle grubs that has resulted in increased cocoon formation. "Instead of using cross-section trays with individual compartments 1 inch square, the grubs were placed loose in boxes 15 by 12 inches containing 5 inches of soil with wheat and in cans 6 inches in diameter containing 4 inches of soil with wheat. Twenty grubs were placed in each container, 160 grubs in boxes and 100 grubs in cans. The containers were placed in a cellar at 74° F. After sufficient time had elapsed, examinations were made and it was found that 79 per cent of the parasitized grubs in the boxes and 65 per cent of the grubs in the cans had formed cocoons. As only 34.3 per cent of all the parasitized grubs used in propagation in 1931 formed cocoons, the above data are sufficient to indicate that, despite the cannibalistic tendencies of the Japanese beetle grubs, the greatest cocoon formation might come from parasitized grubs placed unrestricted in small containers."

TRUCK CROP AND GARDEN INSECTS

Puerto Rican mole cricket predatorial and cannibalistic.---W. A. Thomas, Chadbourn, N. C., reports that "The work of dissecting mole-cricket (Scapteriscus vicinus Scudd.) stomachs to determine the food under natural environment * * * shows that the great bulk of food * * * is insects, both dead and living, and other forms of lower animal life. There is much evidence now that these insects are cannibalistic * * *. Crops examined during the past month have shown a large percentage of

parts of mole crickets devoured in the feeding operations. In some of the specimens the muscles attached to parts of the body covering, as well as internal organs, appeared to be normal in color such as is found in living specimens. Ordinarily these organs rapidly become darkened after death. The retention of this color, together with the volume of mole-cricket parts taken from crops, indicates that the specimens were not decaying bodies when eaten and lends additional support to the theory of cannibalistic habits under natural conditions. The food studies are beginning to show * * * why the insects frequent the edges of streams, ponds, ditches, and depressions where sediment is deposited as water evaporates. Insects and other lower forms of animal life, both dead and living, concentrate in such areas, giving a more adequate food supply as well as supplying necessary moisture for normal activity. It is also being found that mole crickets may maintain life for considerable periods without food, provided suitable moisture requirements are maintained." The principal damage done by the mole cricket is that it burrows near the surface of the soil in a manner similar to that of the ground mole.

Tachinid parasite of Mexican bean beetle breeds readily in the field, but there is yet no evidence that it successfully passes the winter.--In October B. J. Landis and R. W. Brubaker recovered a specimen of the parasite Paradexodes epilachnae Ald. "from a collection of beetles from 18 to 20 miles from the nearest point of liberation in 1932 but very close to the point of liberation in 1931 near Moorestown, N. J.," according to Neale F. Howard, in charge of the Columbus, Ohio, laboratory. This "indicates either that the fly overwintered there, or that * * * it spread at least 18 miles. A spread of 18 miles is considered quite possible in view of the fact that the fly spread and became abundant 10 or 11 miles from the point of liberation at Columbus, during 1931. Results indicate that under favorable conditions liberations of a few hundred flies are sufficient to establish a large colony and that further liberations during the same season are not necessary. Most of the liberations during the 1932 season were successful and in some instances the recovery approximated or exceeded 50 per cent of parasitized larvae collected at random in the field."

Soil dried out by alfalfa crop reduces wireworm population.--"Studies on the relation of moisture to the abundance and distribution of Limonius canus Lec. * * *," writes E. W. Jones, of Walla Walla, Wash., "indicate that the moisture factor at either of its extremes is very effective in reducing wireworm infestations. Wireworms die in dry soil as the result of desiccation. Fine sandy loam and clay loam soils planted to alfalfa dry out to approximately 20 per cent of their water-holding capacity during the growing season if not irrigated during the summer. This low soil-moisture content is obtained in the surface foot where the wireworm population is to be found. Consequently the wireworms are reduced in numbers. * * * one season of alfalfa, when not irrigated in the summer, will reduce wireworm infestations about 74 per cent and still a good crop may be obtained."

Earwigs dwell in trees.--According to S. E. Crumb, of Puyallup, Wash., "Earwigs are fond of lurking in trees. In a heavily wooded spot every curled leaf, every loose flake of bark, and every suitable hole will be occupied by one or more earwigs and a surprisingly large number are able to find hiding places in a small tree. This fondness for trees is due in part to the fact that, other things being equal, the earwig prefers to hide about some object above the ground rather than on the ground itself and in part to the fact that trees usually provide satisfactory food, including bark, algae, aphids, dead insects, and sweet fruits."

Biology of the lima bean pod borer in California.--"The rainfall the latter part of September was followed by low night temperatures during the entire month of October," writes Rodney Cecil, of Ventura, Calif. "The lower temperatures apparently caused Etiella zirclorella Trill. to prepare for overwintering. This was noticeable by a decrease in the number of eggs deposited by the females and cessation of pupation * * *. With the above indications that the normal overwintering period was beginning, mature larvae were collected and put outside in screened cages in different localities to determine the length of the overwintering period and the percentage of survival. The mature larva enters the soil to a depth of one-fourth to one-half inch and spins a cocoon in which it passes the winter. Pupation and emergence of the adult do not occur until the latter part of February or the first of March. * * * There may also be larvae that do not mature until late in December that also overwinter. For this reason the overwintering period varies, ranging in length from two to seven months."

Unsuitable host plants reduce fat reserve of sugar beet leafhopper.--Fat determinations on Eutettix tenellus (Esh.) collected on sage, made by R. A. Fulton, of Twin Falls, Idaho, showed a decrease during four weeks to a minimum of 34 per cent, demonstrating that the bugs were apparently unable to synthesize fat in normal quantities from this host. "The forcing of E. tenellus to sage and other unsuitable hosts following the early death of summer hosts and late fall germination of spring hosts such as characterizes the present season would seem to be causally associated with high fall mortality due to the inability of E. tenellus even to maintain a normal fat reserve on these hosts."

New sweetpotato weevil infestations may be caused by high tides.--"In connection with new Alabama infestations of Heteroderes laurentii Guér. a very important discovery was made," according to K. L. Cokerham, Biloxi, Miss. "In endeavoring to locate the source of infestation in this area, inspections were made in a near-by salt marsh for morning glories. On October 20 two species of morning glories were found. * * * Ipomoea speciosa and I. littoralis. I. speciosa was found to be rather heavily infested with the sweetpotato weevil (Cylas formicarius Fab.) Almost every other clump of vines examined showed the presence of this insect. Only a few specimens of I. littoralis were found and no infestations were noted in them. It is likely that the field infestations were noted in them. During the fall two tropical storms swept this area, bringing with them high tides which entirely covered this marsh and sent high-tide waters up the rivers and bayous. One such bayou passes through the section where these (field) infested patches are."

Cyclamen mite succumbs to hot water.--Laboratory experiments indicate that immersion of Cyclamen plants in hot water at 110° F. for 10 or 15 minutes will kill Tarsonemus pallidus Bks. within the curled leaves, flower buds, or between the bases of leaves at the crown of the plant without injury to the plant, according to F. F. Smith, of the tropical greenhouse, Washington, D. C. Dr. Smith's work indicates that "the mites gain entrance to the folded young Cyclamen leaves while still mere buds only one-eighth to one-fourth inch long and to the flower buds at a slightly later stage. The mite breeds up to large numbers in these inaccessible places where distortion of growth adds to their protection. It therefore seems that a control program, to be effective, must be started early in the season * * *. Some form of heat treatment seems to be one logical point of attack in attempting to save a Cyclamen crop which is already infested."

Cyanide fumigation effective against the broad mite but not against the Cyclamen mite.--Dr. Smith also reports that, although the Cyclamen mite is little affected by cyanide fumigation at dosages tolerated by the host, the broad mite (T. latus Bks.) may be killed by this treatment. A dosage of three-eighths to one-half ounce per 1,000 cubic feet, especially at 65° F., has given consistently high kills of the broad mite in all stages except the pupal stage, which seemed to be resistant to fumigation at all the temperatures used. The tests "indicated that thrips (Heliothrips haemorrhoidalis Bouché) and mites are killed at about the same dosages, which are slightly higher than those (one-eighth to one-fourth ounce) required to kill the aphid Myzus persicae Sulz. In laboratory tests, using pepper and Irratiens saltani as hosts, infested plants were freed of the mites by three fumigations at 4-day intervals."

Vapor-heat treatment for insects in narcissus and lily bulbs.--In connection with vapor-heat treatments of narcissus and lily bulbs at Sumner, Wash., experiments to determine the minimum time required to give complete mortality of the insects concerned have been carried out by Randall Latta, working with narcissus bulbs for the control of Merodon equestris Fab. and Eumerus spp., and by Ralph Schopp, working with lily bulbs for the control of Liothrips vaneeckei Priessner. Their results may be summarized as follows:

Temperature (° F.)	Time required for complete mortality (hours)		
	<u>Merodon equestris</u>	<u>Eumerus</u> spp.	<u>Liothrips vaneeckei</u>
106	6	5	1 3/4
107	4 1/2	3 1/2	--
108	3 1/2	2	1 1/2
109	2 1/2	1	--
110	1 3/4	3/4	1
111	1 1/4	1/2	--

Exposure to 105° F. did not give a complete kill of Merodon equestris after 9 1/2 hours or of Eumerus spp. after 7 1/2 hours.

Combination sprays containing molasses most toxic to both larvae and adults of gladiolus thrips.--The apparent efficiency of molasses as a component of a nicotine sulphate spray against larvae of the gladiolus thrips (Taeniothrips gladioli M. & S.), as indicated by laboratory experiments and reported last month by H. H. Richardson, of the tropical greenhouse, led him to compare the efficiency of molasses and brown sugar as components of Paris green sprays against the adult thrips. The results "indicate clearly that the combination of Paris green with molasses is equal to, if not surpassing, in efficiency the brown-sugar spray. Apparently the molasses sprays act faster. This might be expected when the fact is taken into consideration that molasses wets the foliage more efficiently than does brown sugar."

FOREST INSECTS

Long-distance migration of mountain pine beetle indicated.--A. L. Gibson, of Coeur d'Alene, Idaho, reports: "An interesting contribution to our knowledge of the flight potentials of the mountain pine beetle (Dendroctonus monticolae Hopk.) is now occurring within the Sheep Creek Canyon, an area of lodgepole pine some 10 miles south of Dillon in which an outbreak of this insect was reported in 1930. A large percentage of the infested trees were treated in the spring of 1931, not more than 1,000 being left untreated. A survey of the area in the fall of 1931 showed some 23,000 trees recently attacked. Though difficult to prove, this extremely heavy attack could only be satisfactorily explained through a flight of beetles from some of the neighboring heavily infested areas, as it was not believed that there were sufficient untreated trees left on the area to permit such an increase in infestation. Though no control measures were taken in the spring of 1932, * * * a survey of the area during October showed 143,000 infested trees. An increase of this magnitude could not have originated within the area and the beetles must have come from the nearest infestation some 25 miles away, with untimbered areas between. Though this seems to show rather conclusively that the mountain pine beetle either flies or is carried by favorable air currents for at least 25 miles, it does not give us any information as to the maximum potentials of the spread of such outbreaks."

Braconid parasite decimates Douglas fir beetle.--According to W. D. Bedard, of Coeur d'Alene, "The importance of Coeloides brunneri Vier., a braconid parasite, is shown in the following results obtained from a brood analysis of the Douglas fir beetle (Dendroctonus pseudotsugae Hopk.). Seventy-six square feet of bark surface were intensively examined on 12 Douglas fir trees attacked in 1932 by this beetle. Although there were on an average 8 1/2 attacks per square foot of bark surface, these produced only 1 1/2 insects per attack. Such an increase is barely sufficient to maintain the infestation at its present intensity. Coeloides brunneri was the most important agency in reducing the potential infestation, as 60.1 per cent of the Douglas fir beetle brood had been parasitized by this insect."

CEREAL AND FORAGE INSECTS

Biology of a Hessian fly parasite.—C. C. Hill, Carlisle, Pa., states that he has taken advantage of a recent heavy emergence of the Hessian fly parasite Tetrastichus carinatus Forbes to work out its life history and morphology, as nothing has been published on this subject. He finds: "The parasite oviposits in the host both when it is in the larval stage and after the puparium has been formed. The entire larval period is passed within the host. The egg has been recovered and drawn, as well as the first, second, and last larval instars. The primary larva is unlike any chalcidoid first-instar larva known to the writer because of peculiarly located palpi on the head and peculiar spiny plates which cover the entire body except the head and part of the ventrum. There is every indication that this parasite passes through only three instars, * * * a departure from the usual five instars which most chalcidoids have. The ovipositing adult is short lived, since most of them last only from 8 to 11 days."

Southwestern corn borer extends its range.—In October J. R. Horton and E. T. Jones, of Wichita, Kans., made a survey of the new territory gained by the southwestern corn borer (Diatraea grandiosella Dyar) in the past year. They report: "In the north Texas panhandle, the borer was found to have established itself, 4 per cent infestation, at 2 miles west and 2 north of Perryton, no extension of line eastward between Perryton and Canadian. * * * In Oklahoma proper east of Wellington, Tex., was found the greatest extension into new territory encountered. The borer was found near Madge, Okla., again at 6 miles north of Hollis, and again at 7 miles north of Gould, the infestation apparently confined to corn along the Salt Fork of the Red River and its tributaries. * * * Another notable extension was found along the Red River in Texas, where a 36 per cent infestation was found 8 miles north of Childress in corn not infested last year. Away from the river also infestations were found 7 miles east and south of Childress, to a point 3 miles west of Kirkland."

Barium silicofluoride spray protects dahlias from corn borer.—C. H. Batchelder and assistants, who have been experimenting at Berkley, Mass., with insecticides for dahlia plants infested with Pyrausta nubilalis Hbn., have found barium silicofluoride to be satisfactory in reducing infestation without injury to the plants. "Barium silicofluoride (2.25 pounds per 100 gallons) and nicotine tannate (0.75 pint + 1.5 pounds per 100 gallons) were compared as suspensions in a 0.5 per cent oil emulsion. * * * Both insecticides were effective in materially reducing both stalk injury and the larval population * * * in infestations originating from migration as well as from egg deposition. * * * no foliage or blossom injury was found. On the contrary, blooms were larger in treated plants, and in most varieties more blooms were produced than on the untreated plants. It was also noted that marked reduction of 'blight' (a fungous disease) occurred when the plants were treated with barium silicofluoride. The data indicate that, when employed against an infestation originating from natural oviposition, barium silicofluoride is more effective than nicotine tannate."

Laboratory at West Lafayette, Ind., moved to Lafayette.---The field laboratory of the Division of Cereal and Forage Insects, formerly located at 500 University St., West Lafayette, Ind., was moved on October 4 to the new Post Office Building, 4th and Ferry Sts., Lafayette, Ind. C. M. Packard is in charge.

Effect of low temperatures on reproduction of the pea (alfalfa) aphid.---"In the rearing cages in the insectary the effect of the low temperatures reduced markedly the number of young Illinoia pisi Kalt. born each day and the length of time between birth and maturity," according to S. J. Snow, of Fallen, Nev. "With a mean temperature for the month of 50.3° F. the average number of young per day was 1.4 for wingless forms and 0.8 for winged forms. In September, with a mean temperature of 64.7° F. for the last half of the month, the number was double this--3.3 per day for wingless and 1.6 for winged forms. A few specimens were carried through from birth to the time of reproduction in late September and early October with an average of 13.3 days for wingless and 15 days for winged forms. For the balance of October, including specimens which were started later in September, the length of this maturing period was 19.6 days for wingless and 21.4 days for winged forms."

COTTON INSECTS

Biology of fourth brood of pink bollworm at Presidio, Tex.---Biological studies on Pectinophora gossypiella Saund., which S. L. Calhoun and assistants have been conducting at Presidio, gave the following results in October: "The average longevity for fourth-brood females in squares was 12.4 days and for males 9.5 days at mean temperatures of 74.0° and 74.6° F., respectively. The average number of eggs laid by females of this brood depositing fertile eggs was 74.7, and the maximum for a single female, 129. Eighty per cent of the females under observation laid fertile eggs. Records on egg fertility during October revealed that 75.3 per cent hatched. At mean temperatures ranging from 73.9° to 65.9° F. the mean incubation period for any egg mass ranged from 6.8 to 11.6 days. Collections of recently opened bolls on October 4, 14, and 24 showed them to contain 457, 525, and 514 fourth-instar larvae, respectively, per 100 bolls. Examination of 100 blooms on October 25 showed them to contain 44 fourth-instar and 31 third-instar larvae."

INSECTS AFFECTING MAN AND ANIMALS

Predatory beetles associated with blowflies breeding in carcasses.

--As a result of a study of the breeding habits of predatory beetles associated with blowflies, including species of Saprinus, Creophilus, Necrophorus, Cyanellus, Trox, Silpha, and Dermestes, R. A. Roberts, Uvalde, Tex., reports his efforts, which met with varying success, to propagate these beetles under confined conditions. In conclusion he says: "The beetles showing promise as predators * * * are Saprinus and Creophilus * * * for the following reasons: (a) These beetles are abundant at carcasses, (b) they are easily propagated, (c) they are long lived, (d) they are prolific, and (e) they attack the matured as well as early blowfly larvae."

Sectional pole support for camera aids in photographing environment.--In photographing sand-fly breeding places in marshes, W. E. Dove, of Savannah, Ga., writes that it has been difficult to avoid giving undue prominence to tall grass near the camera. "To overcome this," he says, "we constructed sections of a pole so that they can be assembled and set up in a desired locality. The camera is mounted on a tilting top. Guy ropes lead from metal pins in the pole to metal stakes in the marshes. The pins are used as a foothold for climbing the pole. When dismantled, the pole sections are conveniently transported in a small automobile."

Longevity of the swamp mosquito.--According to H. H. Stage, in charge of mosquito investigations at Portland, Oreg., "The last Aedes vexans Meig. was taken in the field on September 29, at Wahkeena Falls. The latest date of emergence at this location was June 20, which gives a life span under natural conditions of at least 81 days to the three females captured on that date. One of these remained alive in the laboratory until October 28 and continued to lay eggs in small quantities."